Claims

[1] 1. A method for balancing the load of an internal combustion engine among the cylinders of the engine, which engine is provided with a cylinder specific antiknock control system, **characterised** in that the method comprises the steps of

monitoring each cylinder to find out whether the cylinder knocks continuously by utilising cylinder specific measuring data provided by the antiknock control system,

reducing the quantity of fuel supplied to a knocking cylinder permanently if the knock is continuous,

compensating the change in the total output of the engine caused by said reduction of fuel supply by increasing the fuel supply to the all cylinders of the engine,

storing the new cylinder specific fuel supply values, and

setting the new cylinder specific fuel supply values as cylinder specific set values of engine.

[2] 2. A method according to claim 1, **characterised** in that in the cylinder specific monitoring it is counted how many times within a predetermined time period the cylinder specific antiknock control system needs to initiate an adjustment that endures at least one control period in order to reduce the quantity of fuel supplied to the knocking cylinder.

[3] 3. A method according to claim 2, **characterised** in that the time period, during which the times are counted, is 20 - 40 minutes.

[4] 4. A method according to claim 2, **characterised** in that a cylinder is defined as continuously knocking, when a certain number of times is reached in the counting.

[5] 5. A method according to claim 3 and 4, **characterised** in that the certain number of times reached in the counting is 15 - 25 times.

[6] 6. A method according to any one of claims 1 - 5, **characterised** in that in the compensation a balancing vector including cylinder specific fuel supply co-efficients is used, the aim being to keep the vector sum at the balancing value or close to the balancing value, whereby the effect of the decrease of one coefficient is compensated by increasing the coefficients for the all cylinders.

[7] 7. A method according to any one of claims 1 - 6, **characterised** in that for an engine that is equipped with cylinder specific measuring of exhaust gas temperature, the method may comprise a step, in which the quantity of fuel supplied to the cylinder is increased in response to a fall of temperature down to

a certain level or below that, while measuring the exhaust gas temperature.

[8] 8. A method according to claim 7, **characterised** in that the quantity of the fuel is increased by 1 %, when the temperature of the exhaust gas is 60 degrees below the average.

[9] 9. A method according to any one of claims 1 - 8, **characterised** in that in the cylinder specific antiknock control system the quantity of fuel supplied to the cylinder is either reduced by 1 % every fifth second or increased by 1 % every seventh second, in response to the measuring data.

[10] 10. A method according to any one of claims 1 - 9, **characterised** in that the fuel is a gas.

[11] 11. A method according to claim 10, **characterised** in that in an engine, where besides a gas a light fuel oil may be used as a fuel, the gas used by the engine is replaced by fuel oil, when the cylinder knocks heavily.

[12] 12. A device for balancing the load in an internal combustion engine among the cylinders of the engine, which engine is provided with a cylinder specific antiknock control system, **characterised** in that the device comprises a balancing unit connectable to the cylinder specific antiknock control system, which device is adapted to take the measures according to claim 1.

[13] 13. A device according to claim 12, **characterised** in that in the cylinder specific monitoring performed by the device it is counted how many times within a pre-determined time period the cylinder specific antiknock control system needs to initiate an adjustment that endures at least one control period in order to reduce the quantity of fuel supplied to a knocking cylinder.

[14] 14. A device according to claim 13, **characterised** in that the time period, during which the times are counted, is 20 - 40 minutes.

[15] 15. A device according to claim 13, **characterised** in that the device defines a cylinder as continuously knocking, when a certain number of times is reached in the counting.

[16] 16. A device according to claim 14 and 15, **characterised** in that the certain number of times reached in the counting is 15 - 25 times.

[17] 17. A device according to any one of claims 12 - 16, **characterised** in that in the compensation a balancing vector is used including cylinder specific fuel supply coefficients and the aim is to keep the vector sum at the balancing value or close to the balancing value, whereby the effect of the decrease of one coefficient is compensated by increasing the coefficients for the all cylinders.

[18] 18. A device according to any one of claims 12 - 17, **characterised** in that the fuel is a gas.

[19] 19. A device according to claim 18, **characterised** in that in the engine, where

besides a gas a fuel oil may be used as a fuel, the gas used by the engine is replaced by fuel oil, when the cylinder knocks heavily.

[20] 20. A computer program connectable to the control system of an internal combustion engine, **characterised** in that the computer program is adapted to take the measures according to claim 1, when the computer program is being run.